

I CLAIM:

1. A data transceiver capable of transmitting and receiving data, said data transceiver comprising:

a self-test data generator for generating test data;

a transmitter section coupled to said self-test data generator, said transmitter section operable for receiving said test data and processing said test data in the same manner as any other data to be transmitted by said transmitter section;

a receiver section coupled to said transmitter section, said receiver section operable for receiving said test data output by said transmitter section, and for processing said test data in the same manner as any other data to be received by said receiver section;

a test data analyzer coupled to said receiver, said test data analyzer operative for verifying the accuracy of said test data output by said receiver, and outputting an error signal if there is an error in said test data;

wherein said self-test data generator and said test data analyzer are independently controllable.

2. The data transceiver of claim 1, wherein said independent control of said self-test data generator and said test data analyzer allows for one of the self-test data generator and said test data analyzer to be enabled, while the other is disabled.

3. The data transceiver of claim 1, wherein:

said self-test data generator generates test data in a digital word format having a predetermined number of bits;

said transmitter section receiving said test data in said digital word format, converting said test data into a serial data format, and transmitting said test data as serial data;

said receiver section receiving said test data from said transmitter section in said serial format, converting said test data into a digital word format, and outputting said test data as a digital word; and

said test data analyzer receiving said test data from said receiver section in a digital word format.

4. The data transceiver of claim 3, wherein said transmitter section converts said test data from said digital word format to said serial format in accordance with the Universal Serial Bus Standard 2.0; and said receiver section converts said serial test data received from said transmitter section to said digital word format in accordance with the Universal Serial Bus Standard 2.0.

5. The data transceiver of claim 1, further comprising a multiplexer coupled to said self-test data generator and said transmitter section, said multiplexer having a first input coupled to an output of said self-test generator via a data bus, a second input coupled to an external data bus, and a first output coupled to an input of said transmitter section, said multiplexer operative for coupling either the output of said self-test data generator or the external bus to said input of said transmitter section.

6. The data transceiver of claim 1, wherein said self-test generator and said test data analyzer comprise the same pseudo-random number generator capable of generating a digital word, said test data analyzer further comprising a comparator operative for

comparing said test data received from said receiver section with data generated by said pseudo-number random generator contained in said test data analyzer.

7. The data transceiver of claim 6, wherein said self test generator and said test data analyzer are coupled to an external data bus.

8. The data transceiver of claim 7, wherein said pseudo random number generator contained in said self-test generator and said pseudo random number generator contained in said test data analyzer have programmable data values, said data values being input into both of said pseudo random number generators via said external bus.

9. A data transceiver capable of transmitting and receiving data, said data transceiver comprising:

a self-test data generator for generating test data, said self-test data generator comprising a first pseudo-random number generator capable of generating a digital word, said first pseudo-random number generator having a programmable data value, said data value being input into said first pseudo random number generator via an external bus coupled to said self-test data generator;

a transmitter section coupled to said self-test data generator, said transmitter section operable for receiving said test data and processing said test data in the same manner as any other data to be transmitted by said transmitter section;

a receiver section coupled to said transmitter section, said receiver section operable for receiving said test data output by said transmitter section, and for processing said test data in the same manner as any other data to be received by said receiver section;

a test data analyzer coupled to said receiver, said test data analyzer operative for verifying the accuracy of said test data output by said receiver, and outputting an error

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signal if there is an error in said test data, said test data analyzer comprising a second pseudo-random number generator capable of generating a digital word, said second pseudo-random number generator having a programmable data value, said data value being input into said second pseudo random number generator via an external bus coupled to said test data analyzer.

10. The data transceiver of claim 9, wherein said first pseudo random number generator and the second pseudo random number generator are the same.

11. The data transceiver of claim 9, wherein said self-test data generator and said test data analyzer are independently controllable.

12. The data transceiver of claim 11, wherein said independent control of said self-test data generator and said test data analyzer allows for one of the self-test data generator and said test data analyzer to be enabled, while the other is disabled.

13. The data transceiver of claim 9, wherein:
said self-test data generator generates test data in a digital word format having a predetermined number of bits;

said transmitter section receiving said test data in said digital word format, converting said test data into a serial data format, and transmitting said test data as serial data;

said receiver section receiving said test data from said transmitter section in said serial format, converting said test data into a digital word format, and outputting said test data as a digital word; and

said test data analyzer receiving said test data from said receiver section in a digital word format.

14. The data transceiver of claim 13, wherein said transmitter section converts said test data from said digital word format to said serial format in accordance with the Universal Serial Bus Standard 2.0; and said receiver section converts said serial test data received from said transmitter section to said digital word format in accordance with the Universal Serial Bus Standard 2.0.

15. The data transceiver of claim 9, further comprising a multiplexer coupled to said self-test data generator and said transmitter section, said multiplexer having a first input coupled to an output of said self-test generator via a data bus, a second input coupled to said external data bus, and a first output coupled to an input of said transmitter section, said multiplexer operative for coupling either the output of said self-test data generator or the external bus to said input of said transmitter section.

16. The data transceiver of claim 9, wherein said test data analyzer further comprises a comparator operative for comparing said test data received from said receiver section with data generated by said second pseudo-number random generator contained in said test data analyzer.

17. A data transceiver capable of transmitting and receiving data, said data transceiver comprising:

a self-test data generator for generating test data, said self-test data generator comprising a first pseudo-random number generator capable of generating a digital word, said first pseudo-random number generator having a programmable initial data value, said data value being input into said first pseudo random number generator via an external bus coupled to said self-test data generator;

a transmitter section coupled to said self-test data generator, said transmitter section operable for receiving said test data and processing said test data in the same manner as any other data to be transmitted by said transmitter section;

a receiver section coupled to said transmitter section, said receiver section operable for receiving said test data output by said transmitter section, and for processing said test data in the same manner as any other data to be received by said receiver section;

a test data analyzer coupled to said receiver, said test data analyzer operative for verifying the accuracy of said test data output by said receiver, and outputting an error signal if there is an error in said test data, said test data analyzer comprising a second pseudo-random number generator capable of generating a digital word, said second pseudo-random number generator having a programmable data value, said data value being input into said second pseudo random number generator via an external bus coupled to said test data analyzer;

wherein said self-test data generator and said test data analyzer are independently controllable.

18. The data transceiver of claim 17, wherein said independent control of said self-test data generator and said test data analyzer allows for one of the self-test data generator and said test data analyzer to be enabled, while the other is disabled.

19. The data transceiver of claim 17, wherein:

said transmitter section receives said test data in said digital word format, converts said test data into a serial data format, and transmits said test data as serial data; and

said receiver section receives said test data from said transmitter section in said serial format, converts said test data into a digital word format, and outputs said test data as a digital word.

20. The data transceiver of claim 19, wherein said transmitter section converts said test data from said digital word format to said serial format in accordance with the Universal Serial Bus Standard 2.0; and said receiver section converts said serial test data received from said transmitter section to said digital word format in accordance with the Universal Serial Bus Standard 2.0.

21. The data transceiver of claim 17, further comprising a multiplexer coupled to said self-test data generator and said transmitter section, said multiplexer having a first input coupled to an output of said self-test generator via a data bus, a second input coupled to said external data bus, and a first output coupled to an input of said transmitter section, said multiplexer operative for coupling either the output of said self-test data generator or the external bus to said input of said transmitter section.

22. The data transceiver of claim 17, wherein said test data analyzer further comprises a comparator operative for comparing said test data received from said receiver section with data generated by said second pseudo-number random generator contained in said test data analyzer.

23. A data transceiver capable of transmitting and receiving data, said data transceiver comprising:

a self-test data generator for generating test data comprising a digital word, said self-test data generator being programmable so as to allow selection of a data value of said

test data , said data value being input into said self-test generator via a data bus coupled to said self-test data generator;

a transmitter section coupled to said self-test data generator, said transmitter section operable for receiving said test data and processing said test data in the same manner as any other data to be transmitted by said transmitter section;

a receiver section coupled to said transmitter section, said receiver section operable for receiving said test data output by said transmitter section, and for processing said test data in the same manner as any other data to be received by said receiver section;

a test data analyzer coupled to said receiver, said test data analyzer operative for verifying the accuracy of said test data output by said receiver, and outputting an error signal if there is an error in said test data, said test data analyzer being programmable so as to allow selection of a data value, initial data value being input into said test data analyzer via an external bus coupled to said test data analyzer.

24. The data transceiver of claim 23, wherein said self-test data generator and said test data analyzer are independently controllable.

25. The data transceiver of claim 24, wherein said independent control of said self-test data generator and said test data analyzer allows for one of the self-test data generator and said test data analyzer to be enabled, while the other is disabled.